

Referring to Fig. 3, a wireless access system according to a third embodiment of the present invention is such that the down-link channel from a wireless home gateway 17 to each of data terminals $44_1, \dots, 44_N$ uses a 60-GHz frequency band, and the up-link channel from the data terminal $12_1, \dots, 12_N$ to the home gateway 17 uses a 5-GHz frequency band dedicated to a home use. In the present embodiment, the wireless base station in the previous embodiment is replaced by the wireless home gateway 17, and the wireless subscriber's terminal is replaced by a wireless module 18. The user sever 48 is installed in a content provider 16.

The data terminal may be a portable data assistant.

The wireless home gateway 17 in the present embodiment includes a 60-GHz transmitter unit 45 having an antenna, a power amplifier, and an up-link converter, a 5-GHz receiver unit 36 having an antenna, a LNA and a down-link converter, and a wireless MAC unit 43 having a baseband modem unit between the same and the data terminal 44. The MAC unit 43 has a two-band wireless system conversion function for the data between the Ethernet and the transmitter units etc.

Each of the wireless modules $18_1, \dots, 18_N$ includes a 5-GHz transmitter unit 42 having an antenna, a LNA and a down-link converter, a 60-GHz receiver unit 41 having an antenna, a LNA and a down-link converter, and a wireless MAC unit 43 having a baseband modem between the same and the data terminal 44. The wireless MAC unit 44 has a two-band wireless system conversion function between the Ethernet and the transmitter etc.

Operation of the wireless access system of Fig. 3 will be described

with reference to an example in which the data terminal 44 accesses the user server 48 to request the same of transferring a large-capacity file such as an on-demand image data file or a game software.

First, the data terminal 44 transmits a request packet.

5 The request packet is fed to the wireless module 18 installed in or attached to the data terminal 44.

10 The request packet fed to the wireless module 18 is converted by the wireless MAC unit 43 into the frame format of the 5-GHz wireless link, subjected to modulation and frequency conversion, and then transmitted to the 5-GHz transmitter unit 42.

15 The request packet transmitted from the 5-GHz transmitter unit 42 is received by the 5-GHz receiver 46 in the wireless home gateway 17, subjected to frequency conversion and demodulation to be restored to the original request packet in the wireless MAC unit 47.

20 The request packet restored in the wireless home gateway 17 is fed through a high-speed access network and a communication network 13 connected to wireless home gateway 17 to the user server 48 in the content provider 16.

The user server 48 in the content provider 16 receives the request packet, and returns a response packet group.

The response packet group arrives at the wireless home gateway 17, which transmitted the request packet, through the high-speed access network and the communication network 13.

25 The response packet group fed to the wireless home gateway 17 is converted by the wireless MAC unit 47 into the frame format of the 60-

GHz-band wireless link, subjected to modulation and frequency conversion to be fed to the 60-GHz-band transmitter unit 45.

The response packet group fed through the 60-GHz-band transmitter unit 45 is received by the 60-GHz-band receiver unit 41
5 installed in or attached to the data terminal 44, subjected to frequency conversion and demodulation to be restored to the original response packet group in the wireless MAC unit 43.

The response packet group thus restored to the original packet group is fed to the data terminal 44 for storage and display thereof.

10 Referring to Fig. 4, a wireless access system according to a fourth embodiment of the present invention is such that the down-link channel from the wireless base station 11 to each of the wireless subscriber's terminals $12_1, \dots, 12_N$ uses a 26-GHz or 2.4-GHz wireless frequency band, and the up-link channel from each of the subscriber's terminals $12_1, \dots$
15 12_N to the wireless base station 11 uses an optical communication system, for achieving a higher efficient point-to-multipoint wireless communication system. In the present embodiment, the user's terminal 58 requests the user server 54 of transmitting a response packet to the user's terminal 58.

20 The wireless base station 11 includes an optical receiver 56 having a lens system, an optical sensor, and a down-link converter, a sub-millimeter/millimeter wave transmitter unit 55 having an antenna, a power amplifier, and an up-link converter, and a wireless MAC 57 having a baseband modem between the same and the communication network 13.
25 The wireless MAC 57 has a two-band wireless system conversion